

EPA United States Environmental Protection Agency Washington, DC 20460 Work Assignment		Work Assignment Number 4-21 <input type="checkbox"/> Other <input checked="" type="checkbox"/> Amendment Number: 000001								
Contract Number EP-C-08-010	Contract Period 12/16/2008 To 05/30/2014 Base Option Period Number 4	Title of Work Assignment/SF Site Name Metrics and Impact analyses								
Contractor SCIENTIFIC CONSULTING GROUP, INC, THE		Specify Section and paragraph of Contract SOW 2.3 & 2-4								
Purpose: <input type="checkbox"/> Work Assignment <input type="checkbox"/> Work Assignment Close-Out <input checked="" type="checkbox"/> Work Assignment Amendment <input type="checkbox"/> Incremental Funding <input type="checkbox"/> Work Plan Approval		Period of Performance From 12/01/2011 To 05/30/2014								
Comments:										
<input type="checkbox"/> Superfund Accounting and Appropriations Data <input checked="" type="checkbox"/> Non-Superfund										
SFO (Max 2) <input type="checkbox"/> Note: To report additional accounting and appropriations data use EPA Form 1900-69A.										
Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1										
2										
3										
4										
5										
Authorized Work Assignment Ceiling										
Contract Period: 12/16/2008 To 05/30/2014		Cost/Fee:				LOE:				
This Action:										
Total:										
Work Plan / Cost Estimate Approvals										
Contractor WP Dated:		Cost/Fee:				LOE:				
Cumulative Approved:		Cost/Fee:				LOE:				
Work Assignment Manager Name Myles Morse						Branch/Mail Code:				
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PERFORMANCE WORK STATEMENT
Contract Number: EP-C-08-010
Work Assignment Number 04-21 Amend 1

Title: Metrics and Impact analyses

SOW Section & Paragraph: 2.3 – 2-4

PERIOD OF PERFORMANCE: Option Year 4: Issuance to May 30, 2014

The purpose of this Work Assignment is to provide support to the National Center for Environmental Research (NCER) and the Office of Research and Development (ORD) for the compilation and reporting of impact metrics for the use in various performance reviews of NCER and ORD research programs. Performance reviews of ORD programs (including the extramural component managed by NCER) are conducted by the Board of Scientific Counselors (BOSC) every 4 years and the Office of Management and Budget (OMB; previously through the Program Assessment Rating Tool [PART] process). Citation analyses (bibliometrics) and Decision Document Analyses (DDAs) currently are conducted for these reviews, and these impact measures have been used by the ORD laboratories and centers for internal reviews and metrics such as the ORD scorecard. These metrics, along with other measures such as the number of companies established; employee positions created; researchers funded; and models, methods and processes developed, will be used to define the NCER research impact on the green economy. NCER needs to be able to demonstrate to Congress and the public that its research funding has a large return on investment through a direct impact on jobs, the economy and the environment, as well as developing the next generation of environmental scientists and engineers. The ability to communicate these impacts through several media will define the success and longevity of NCER's research programs. SCG will compile up to 10 bibliometric and DDA reports as requested by the WA COR. These reports shall include an executive summary as well as descriptions, tabulations and graphic analyses of findings and comparisons to benchmarks using Thomson-Reuter's *Essential Science Indicators* (ESI), InCites and *Web of Science* (WOS); Elsevier's Scopus; and "bibliometrics in a box" database tools. SCG will include a definition of baselines and caveats about any changes to those baselines in the report. SCG also will compare the major findings of the analyses with the results of any previous bibliometric and DDA reports for each research area. SCG will maintain an awareness of standards, thresholds, journal metrics and other parameters used in the field of bibliometrics. SCG will notify the WA COR when any ESI baselines or methodologies change, and the COR may determine that the change is significant enough to warrant a recalculation of previous analyses to allow comparison of current analyses to those conducted in the past. Bibliometric and DDA reports shall be submitted electronically to the WA COR in Word format. SCG will identify all pertinent citing documents, including policy, regulatory and similar decision documents at all levels of government (United States and international). SCG also shall identify anecdotal examples that demonstrate the impact of NCER's research projects that could be used in performance reviews, outreach campaigns and technology transfer communications to both targeted audiences and the general public. Support for the following four tasks: (1) Basic Bibliometric Analyses, (2) Data Mining Analyses/DDA Reports, (3) Special Add-Ons to Bibliometric Reports, and (4) Broadcasting the Impact of How Cited Research Is Being Used. SCG's approach to these four tasks is presented below.

Technical Approach

Task 1: Basic Bibliometric Analyses. SCG will conduct up to 3 topical citation analyses using accepted Webbased tools such as Thomson-Reuter's WOS, Incites, *ESI* and Journal Citation Reports (JCR); Elsevier's Scopus; Dialog's Citation Index; Google Scholar's cited by data; and other similar resources. EPA will provide the bibliographies to be analyzed. These bibliographies will be complied by the ORD National Program Directors (NPDs) or NCER's Web database tool, which houses bibliographic citations for all intramural

(identified by the NPDs) and extramural publications. These bibliographies will include a mix of publication types and typically will contain 200 to more than 3,000 journal publications.

Using the bibliographies of intramural and extramural publications provided by EPA, SCG will conduct searches of WOS, Scopus and Google Scholar to obtain "times cited" data for each publication. The search results will be captured in Reference Manager and exported to Excel for the analysis. SCG also will generate an RIS file of the search results so that the information can be loaded into the Oracle database that feeds the NCER Web search engine. The data will be captured in such a way that extramural and intramural publications can be distinguished and separated. Unless directed otherwise by the WA COR or NPD, SCG will use the 10-year (plus some number of months) rolling period reported by *ESI* (e.g., 2000-2010). In addition, SCG will use *ESI*'s journal list to categorize the publications according to the 22 *ESI* fields and obtain the *ESI* thresholds for the top 10 percent, 1 percent, 0.1 percent, and 0.01 percent of highly cited publications in each field. SCG will use the *ESI* thresholds to determine which publications are highly cited for each of these four thresholds. The report will contain the number of publications meeting each threshold level as well as the full citations of the publications for each level. If it is not too lengthy, the list of publications that meet the 10 percent threshold will be included as an appendix to the report. SCG will obtain the average citation rate for each publication using the average citation rates calculated by *ESI*. The ratio of actual-to-expected cites also will be calculated. SCG also will use *In-Cites* Hot Paper Thresholds to identify any "hot papers" among the program's publications. Hot papers are those publications that are highly cited shortly after they are published. *In-Cites* establishes citation thresholds for hot papers, which are selected from highly cited papers in different fields, but the time frame for citing and cited papers is much shorter—papers must be cited within 2 years of publication, and the citations must occur in a 2-month time period. Papers are assigned to 2-month periods and thresholds are set for each period and field to select 0.1 percent of papers. SCG also will conduct searches of any patents included in the bibliographies to determine if they have been cited by any other patents. SCG will obtain the *JCR* Impact Factor and Immediacy Index for each of the journals in which the publications analyzed are published (when these data are available). Using the Impact Factors and Immediacy Indices, SCG will calculate the number and percentage of publications that are published in high-impact journals as determined by these two indicators.

If requested by the WA COR, SCG will determine the number of author self-cites (primary author to primary author) for each publication analyzed and determine the percentage of self-cites for each program. SCG also will conduct a search of *ISI Highly Cited.com* at the request of the WA COR to determine how many of the authors of the publications analyzed are included in this database of the world's most influential researchers who have made key contributions to science and technology during the period from 1981 to 1999. If there are patents included in the bibliography, SCG will search the patents and identify any other patents/patent applications that have referenced those patents. The number of patents and citing patents will be identified in the report. In addition, the patent/patent application numbers, titles and other information will be included in the report. Similar information for the citing patents also will be presented. When available, SCG also will compare the results of the program bibliometric analysis with data for *ESI* Special Topics Analyses, which summarize publication and citation data from Thomson Scientific for the analysis of research trends and performance. Several *ESI* Special Topics analyses are appropriate for comparisons to ORD research programs, including Air Pollution, Global Warming and Nanotechnology. These special analyses identify the top 20 papers, top 20 authors, top 20 countries publishing in the field and top 20 journals in the field, and top 20 institutions publishing in the field. They also include trends analyses (publication rates, citation rates) for topic papers. Both graphical and tabulated comparisons will be included in the analysis report. SCG will prepare a report on each bibliometric analysis that includes some or all of the following:

- * A summary of the results of the analysis.

- * The number and percentage of highly cited publications that meet the top 10 percent, 1 percent, 0.1 percent, and 0.01 percent thresholds in *ESI*.

h A graphic depicting the percentage of highly cited publications by threshold (top 10%, 1%, 0.1% and 0.01%).

* A graphic presenting the actual number of highly cited publications by threshold compared to the expected number of highly cited publications.

* A graphic comparing the actual number of papers published in high-impact journals versus the expected number to be published in high-impact journals (for both Impact Factor and Immediacy Index).

* A graphic comparing the current results with those of previous bibliometric analyses of the program.

* A table that reports the number of publications by *ESI* field, the times cited for each field and the average citations per paper by field.

* A table identifying the number of highly cited publications (top 10%) by field, number of citations by field, average citations per paper, and percentage of the publications in each field.

* A table identifying the number of highly cited publications (top 1%) by field, number of citations by field, average citations per paper, and percentage of the publications in each field.

* A table identifying the number of highly cited publications (top 0.1%) by field, number of citations by field, average citations per paper, and percentage of the publications in each field.

* A table identifying the number of highly cited publications (top 0.01%) by field, number of citations by field, average citations per paper, and percentage of the publications in each field.

* Tables for each field listing the bibliographic citations for the highly cited papers (top 10%).

* Tables for each field listing the bibliographic citations for the highly cited papers (top 1%).

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* A table listing the bibliographic citations for the highly cited papers (top 0.1%) by field.

* A table listing the bibliographic citations for the highly cited papers (top 0.01%) by field.

* An explanation of the significance of the ratio of actual to expected cites and a table that reports actual cites, expected cites and the ratio of actual to expected cites for each field.

* A definition of the *JCR* Impact Factor and a table reporting the number of papers published in the top 10 percent of journals as determined by Impact Factor, the journal title and the Impact Factor for the journal.

* A definition of the *JCR* Immediacy Index and a table reporting the number of papers published in the top 10 percent of journals as determined by Immediacy Index, the journal title and the Immediacy Index for the journal.

* A table of the hot papers identified in the analysis. The table will include the *ESI* category, the hot papers threshold, the number of citations the paper received during a 2-month period within 2 years of publication, and the bibliographic information for the paper.

* The number and percentage of author self citations (primary author to primary author) and comparison to average self-citation rates reported for research-based literature.

* The number and percentage of authors of the papers included in the *ISI Highly Cited.com* database and a table of these authors, which includes their names, affiliations and *ESI* field(s).

* The number of patents received and patent applications filed by the program's researchers and a table that identifies the patent/patent application number, inventor, title, date and a list of patents that reference each patent.

* A comparison of the program's bibliometric data with that of the *ESI* Special Topics Analysis if an analysis has been conducted by Thomson-Reuters and posted on the Web that offers a reasonable comparison to the ORD program analyzed. This comparison will include the number and percentage of the program's papers that are included in the top 20 papers in the *ESI* Special Topic Analysis; the number of the authors of the program's papers that are included in the top 20 overall authors in the *ESI* Special Topic Analysis; data on the top 20 countries publishing in the *ESI* Special Topic Analysis; the number and percentage of the program's papers that are published in the top 20 journals in the *ESI* Special Topic Analysis; data on the top 20 institutions publishing on the *ESI* Special Topic Analysis; publication trends identified in the *ESI* Special Topic Analysis; and a comparison of *ESI* field distribution of the program's papers with that of the papers included in the *ESI* Special Topic Analysis. Both graphical and tabular comparisons of the program's papers to the *ESI* Special Topic Analysis will be included in the report.

To make the reports more readable, most of the tables will be included as appendices and the citations of the highly cited papers also will be presented in the appendices. The schedule for program reviews currently is uncertain so it is difficult to anticipate how many analyses will be conducted under this Work Assignment. It is expected that SCG may be asked to conduct up to seven basic bibliometric analyses during the period of performance of this Work Assignment. At a minimum, SCG will be asked to conduct one and possibly two analyses of NCER's extramural publications. If only the journal publications are analyzed, the bibliography for NCER analysis will cover approximately 6,300 papers. If nonjournal publications (books, book chapters, reports, proceedings) are included in the analysis, this number could double. If requested by the WA COR, SCG will capture the bibliographic data to ensure that the intramural publications can be separated from the extramural publications for each program. This will allow SCG to run separate analyses of the intramural and extramural publications for the program. SCG will present the results of the analysis in a table that compares the combined analysis with the intramural and extramural analyses. As each program is analyzed, the data for the extramural publications will be added to the table that presents the bibliometric parameters for all extramural publications by program and all programs combined.

Task 2: Data Mining Analyses/Document Data Analysis (DDA) Reports. The data mining analyses are designed to show what pertinent EPA policy, rulemaking and guidance documents cite the investigators' publications in the bibliography compiled for each program. NCER has developed a search tool located at http://cfepa.saicsolutions.com/citing_ncer/RC_Summary.cfm, which operates from the NCER research project database and searches the EPA electronic dockets and the EPA Web inventory. Any EPA documents that cite any of the program publications in the bibliography are brought back as "returned hits" identifying, where possible, the EPA office responsible for the citing document. SCG will perform the following tasks at the direction of the WA COR with respect to the data mining and compilation of the DDA reports:

- Append/update the NCER database holdings as necessary with updates from the bibliometric analyses (i.e., bibliographies from NPDs used for conducting bibliometric analyses). This will include journal publications as well as non-journal publications (e.g., book chapters, EPA reports). These updates will be furnished to the WAM in the form of an RIS file.
- Review the data mining search results ("hit list") provided by the WA COR and eliminate any items that are not policy, rulemaking or decision documents. Also, remove any ORD documents that are not considered rulemaking, policy, decision or guidance documents. SCG will analyze the citing documents

and classify them in the DDA report (e.g., federal rulemaking/regulatory, Integrated Risk Information System [IRIS] assessment, technical/guidance).

- In certain cases and at the request of the WA COR, analyze how the program's publications are being used in the EPA internal documents identified in the search conducted with the data mining tool.
- Analyze and tabulate the results of the data mining search, reporting on the number of policy, rulemaking/regulatory, and decision documents that cite the program's publications and prepare a table of the citing publications for the DDA report. If the DDA is being conducted in conjunction with a bibliometric analysis, the results of both analyses will be presented in a combined report. In addition, where appropriate, the data will be depicted graphically to assist in communicating the research impact through various communication media.
- Identify a small subset of publications in the program bibliography (e.g., the top 1% or top 10% highly cited papers) for which a manual search is conducted for decision documents citing these papers. In general, this subset will include some of the publications that returned "hits" in the data mining search described above as well as some other publications from the bibliography. This subset could range from 20 to 200 publications depending on the size of the program's bibliography.
- Conduct a Google/Google Scholar search of the subset of publications identified above to identify regulatory/rulemaking, policy, guidance and decision documents that cite the publications. This search reaches beyond EPA to include other U.S. agencies, states, and organizations, and foreign governments, agencies, and organizations.
- Analyze and tabulate the results of the Google/Google Scholar search, reporting on the number of policy, rulemaking/regulatory, guidance and decision documents that cite the program's publications and prepare a table of the citing publications for the DDA report.
- Search the Agency for Toxic Substances and Disease Registry (ATSDR) Toxicological Profiles; Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Scientific Advisory Panel (SAP) documents; and Expert Team to Support Biomonitoring in Europe (ESBIO) documents to determine which ones, if any, cite the program publications.
- Analyze and tabulate the results of the ATSDR, FIFRA SAP and ESBIO documents search, reporting on the number of policy, rulemaking/regulatory and decision documents that cite the program's publications and prepare a table of the citing publications for the DDA report.
- At the request of the WA COR, SCG will determine why the EPA publications are being cited. In addition, SCG will identify any trends among the entities citing the EPA documents (e.g., note that most of the documents citing a specific EPA document are international rulemaking documents).

The DDA reports will include a summary of the results of each type of search as well as information on the documents citing the program publications and which publications they cite. The complete citations and URLs for the citing documents will be included in the reports.

Task 3: Special Add-Ons to Bibliometric Reports. The NPDs may request through the WA COR additional permutations to be run as a part of the bibliometric analysis. At the direction of the WA COR, SCG will conduct special analyses for a particular ORD program. These special analyses include:

- **Citation Analysis of Non-Journal Publications**—SCG will run searches using Dialog, Thompson-Reuters, Scopus and Google tools to identify the number of times these non-journal publications are cited in journal publications. The non-journal publications may include EPA reports, books, book chapters, periodicals, proceedings and others. If requested, the *ESI* highly cited thresholds will be applied to these non-journal publications to determine the number and percentage of highly cited non-journal publications meeting the top 10 percent, 1 percent, 0.1 percent and 0.01 percent *ESI* thresholds.
- **Intramural vs. Extramural Analysis**—SCG will analyze the intramural and extramural publications separately upon request and provide a bibliometric analysis report for each. If desired, SCG can provide a report that compares the bibliometric parameters (identified above under the section on Basic Bibliometric Analyses) for the intramural and extramural publications of a program. Although intramural vs. extramural split

analyses have been requested by Board of Scientific Counselors' reviews, the majority of the NPDs prefer a combined analysis because it is more representative of the entire program.

- Grey Literature—Upon request, SCG will conduct a wider search using Google to analyze EPA white papers, websites, and journal and non-journal publications that cite ORD publications. These data will be included in the bibliometric analysis reports.
- Collaborative Analyses—SCG will, in some cases, conduct an analysis of the affiliations of the authors of the publications to provide evidence of collaboration with other EPA entities and external agencies and organizations. Data on collaborations would be incorporated into the bibliometric analysis reports. The numbers and percentage of papers for each collaboration identified (e.g., EPA plus external collaborator(s), multiple EPA ORD laboratories/centers, EPA ORD plus EPA program/regional office(s), EPA plus international collaborator and so forth).
- Various Time Split Analyses—Upon request, SCG will analyze the publications using different time increments. For example, SCG will calculate the bibliometric parameters annually or analyze publications in 5-year increments.
- Analysis by Special Area—Upon request, SCG will analyze the publications in groupings identified by the NPD. For example, for the Global Change Program, the publications will be analyzed by Focus Area (i.e., air quality, human health, regional- and place-based assessment and water quality/aquatic ecosystem). Other NPDs may request that the publications be analyzed by Long-Term Goals (LTGs). The same bibliometric parameters identified above under the section on Basic Bibliometric Analyses will be reported. The NPD will identify the areas and divide the bibliography among the areas to be analyzed.

Task 4: Broadcasting the Impact of How Cited Research Is Being Used.

At the request of the WA COR, SCG will perform the following tasks that will help communicate the impact of ORD research:

* Perform a manual analysis of the full text of some percentage of the highly cited and hot papers to determine how these publications are being used by other scientists/researchers. As part of this analysis, SCG will determine the reason the EPA paper was cited; for example, a paper could be cited because it describes a tool or method, reports baseline characteristics, identifies a dose-response relationship or some other reason. Because such analyses are conducted manually and are very time consuming, these types of analyses will be conducted only at the request of the WA COR and if there are adequate hours and funds available in the Work Assignment.

* Compile anecdotal examples to convey the extent of the research impact. At the request of the WA COR, some of these examples may be expanded and incorporated into multimedia presentations about research impact and could include videotaped interviews, podcasts (audio and video) and other segments.

* Develop communication plans that engage the public and targeted audiences through public service announcements (PSAs), videos, podcasts and other multimedia tools.

* Determine the effectiveness of these types of communication tools on informing various user groups/audiences about the return on research investment. SCG will work with the WA COR to select the most reasonable means of assessing the communication tools. One approach would be to interview up to nine representatives of the user group/audience to obtain feedback on the communication tools. Another approach would be to analyze the number of times a PSA, video, podcasts, and so forth, is accessed on the Web. Feedback posted on the website also could be analyzed to determine the effectiveness of various communication tools.

Schedule of Deliverables

TBD

Prepare and Submit Work Plan and Cost Estimate - within the terms of the contract.

Bibliometric Citation Analyses for Program or Topic Within 4 weeks from assignment by WA

DDA Analyses Within 4 weeks from receipt of the data mining search results from the WA COR

Videos and Other Multimedia To be determined

Per the technical direction clause, the CO and PO will be provided with copies of all technical direction.

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Alternate Work Assignment COR:

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EPA United States Environmental Protection Agency Washington, DC 20460 Work Assignment		Work Assignment Number 4-21								
		<input type="checkbox"/> Other <input type="checkbox"/> Amendment Number:								
Contract Number EP-C-08-010		Contract Period 12/16/2008 To 11/30/2013 Base Option Period Number 4								
Contractor SCIENTIFIC CONSULTING GROUP, INC, THE		Title of Work Assignment/SF Site Name Technology Transfer of Impact								
Specify Section and paragraph of Contract SOW 2.3 & 2-4										
Purpose: <input checked="" type="checkbox"/> Work Assignment <input type="checkbox"/> Work Assignment Close-Out <input type="checkbox"/> Work Assignment Amendment <input type="checkbox"/> Incremental Funding <input type="checkbox"/> Work Plan Approval		Period of Performance From 12/01/2011 To 11/30/2013								
Comments:										
<div style="display: flex; justify-content: space-between;"> <input type="checkbox"/> Superfund <div style="flex-grow: 1; text-align: center;">Accounting and Appropriations Data</div> <input checked="" type="checkbox"/> Non-Superfund </div>										
Note: To report additional accounting and appropriations data use EPA Form 1900-69A.										
SFO (Max 2) <input type="checkbox"/>										
Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1										
2										
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5										
Authorized Work Assignment Ceiling										
Contract Period:		Cost/Fee:		LOE:						
12/16/2008 To 11/30/2013										
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Total:										
Work Plan / Cost Estimate Approvals										
Contractor WP Dated:				Cost/Fee:				LOE:		
Cumulative Approved:				Cost/Fee:				LOE:		
Work Assignment Manager Name Kathi Wiser							Branch/Mail Code:			
_____ (Signature) (Date)							Phone Number 703-347-0334			
							FAX Number:			
Project Officer Name Melissa Revelly-Wilson							Branch/Mail Code:			
_____ (Signature) (Date)							Phone Number: 703-347-8523			
							FAX Number: 703-347-8696			
Other Agency Official Name							Branch/Mail Code:			
_____ (Signature) (Date)							Phone Number:			
							FAX Number:			
Contracting Official Name William Yates							Branch/Mail Code:			
_____ (Signature) (Date)							Phone Number: 513-487-2055			
							FAX Number:			

PERFORMANCE WORK STATEMENT

Contract Number: EP-C-08-010

Work Assignment Number 04-21

Title: Conveying the impact of NCER and ORD funded research through Technology Transfer of Impact of Metrics

SOW Section & Paragraph: 2.3 – 2-4

PERIOD OF PERFORMANCE: Option Year 4: Issuance to November 30, 2013

Background:

In order for EPA to be considered a leader in environmental health research that has significant impact on our health, the environment, and the green economy, ORD & NCER must be able to convey the impact of our funded research to our various targeted audiences. Successful communication of research impacts will result in use of the research findings in policy and decision making processes, adoption of improved processes, technologies, methods, and in the implementation of community interventions. In order for the public and the Hill to understand the importance of our research, proper metrics must be developed and the resultant impact must be interpreted and conveyed through various communication mechanisms so that these audiences can easily see the impact of public dollars spent to protect human health and the environment.

Research impact metrics will also be used in various performance reviews of NCER's research programs. Performance reviews are conducted in four year cycles on ORD/NCER's research programs by the Board of Scientific Counselors (BOSC) and OMB (previously through the PART review process). Citation analyses (bibliometrics) and Decision Document Analyses (DDA) are currently run for these reviews as well as for mid-cycle meetings. In addition these impact measures are used by the ORD labs and centers for internal reviews and metrics such as the ORD score card.

These and other metrics such as the number of companies established, employee positions created, researchers funded, models, methods, processes developed, etc will be used to define NCER research impact on the green economy. NCER needs to be able to demonstrate to the Hill that our research funding has a large return on investment through direct impact on jobs, the economy, and developing the next generation of scientists and engineers. The ability to communicate these impacts thru several mediums will define the success and longevity of NCER's research programs.

The contractor shall assist in the analysis and compilation of various metrics reports, charts, graphics and other tools to demonstrate the worthiness and impact of NCER's funded research. The contractor shall develop new methods of conveying the impact of the analyses to all of our user audiences thru the EPA website, news media, PSAs, social networking sites, listserves, reports to congress, journals, local governments, school systems, public interest groups and other organizations, etc.

The contractor shall compile up to 10 bibliometric and decision document analyses reports as requested by the EPA WA COR. These reports shall include an executive summary as well as descriptions, tabulations, and graphic analyses of findings and comparisons using Thomson's Essential Science Indicators (ESI) database, Thomson's Incites, Web of Science, and El Sevier's Scopus and "bibliometrics in a box" database tools as described in 1 thru 10 below. The contractor shall also include a definition of baselines, and caveats about any changes to those baselines in the report. The contractor shall also run a comparison of the major findings with any previous bibliometric report prepared for each research area. The contractor shall maintain an awareness of standards and thresholds, as well as journal to field allocations used by ESI. The contractor shall notify the

EPA WA COR when any ESI threshold or methodology changes. The EPA WA COR may determine that the change is significant enough to warrant recalculation of previous analyses to allow current analyses to be comparable to past analyses. Bibliometric reports shall be submitted electronically to the EPA WA COR in word format. The contractor shall identify all pertinent citing documents including policy and decision documents at all levels of government. The contractor shall identify anecdotal examples show the impact of NCER's research projects that could be used in outreach campaigns to both targeted audiences and the general public.

Bibliometric & DDA Analyses of Intra and Extramural Publications for external reviews and for communicating impact of research to the public.

Task 1: Basic Bibliometric Analyses:

The contractor shall conduct up to 10 topical citation analyses using accepted web based tools such as Thomson's Web of Science (WOS), Dialog Citation Index, Scopus or other similar data bases. EPA will furnish the contractor with the bibliographies compiled by our NPDs and NCER's web database tool which houses bibliographic citations for all intramural (identified by the NPDs) and extramural program publications. These bibliographies will include a mix of publication types and will typically contain 200 to >3,000 journal publications. The contractor shall address and include the following elements and procedures:

- 1) Use Thomson's ten year rolling periods unless otherwise requested by the EPA WA COR (thru the National Program Directors (NPDs)). The contractor shall input this information into excel spreadsheets, a reference manager database, and the oracle database that feeds the NCER web search engine. The contractor shall run split analyses between intramural and extramural publications.
- 2) Searching WOS and Scopus, the contractor shall record the number of bibliographic citations per publication. In addition the contractor shall note any publications that would be considered highly cited using Thomson's Essential Science Indicator (ESI) database. The contractor shall run analyses for the 10%, 1%, 0.1%, and 0.01% highly cited threshold levels using the 22 research fields tracked by ESI. The number of publications falling into each threshold level shall be tabulated in the bibliometric document, and the full citations meeting each threshold shall be included either in the document or in an appendix (if in excess of 1 full page).
- 3) The contractor shall determine which papers would be considered hot papers using the ESI definition of a hot paper (# of citations within a 2 month period within 2 years of original publication). The contractor shall use this definition

plus the hot paper thresholds set for each of the scientific fields documented in ESI.
- 4) The contractor shall also include comparative tables of NCER and ORD publication average citation rates and ESI's average citation rates for each scientific field.
- 5) The contractor shall include an analysis of the publications for impact factor (the measure of the frequency with which the average article in a journal has been cited in a given year) using Thomson's Journal Citation Index (JCR). This analysis shall include the number of papers published in the top 10% of journals as ranked by the JCR for impact factor.
- 6) The contractor shall include an analysis of the publications for immediacy index (the measure of how quickly the average article is cited in a particular journal) again using the JCR. This analysis shall include the number of papers published in the top 10% of journals as ranked by JCR for

immediacy index.

- 7) The contractor shall include an analysis of author self citation to determine if the self citation rate is above or below average. Currently thresholds are used from publications by Mac Roberts, and Kovacic and Misak. The contractor shall determine whether self citation thresholds are changing by searching for other documentation on a quarterly basis.
- 8) The contractor shall include an analysis of number of authors that have been included in Thomson's HighlyCited.com database.
- 9) The contractor shall include an analysis of any patents listed in the bibliography. The contractor shall also search all principal investigators and coauthors to identify patents associated with the research. This shall also include a tally of the number of patents that were referenced by other patents.
- 10) The contractor shall include comparisons with any additional ESI special topic parameters including top 20 papers, top 20 authors, top 20 countries publishing in the field, top 20 journals in the field, top 20 institutions publishing in the field, and ESI special topics trends analyses (publication rates, citation rates) for topic matched papers used by ESI within the special topic as compared to EPA/NCER papers in that topic. Both graphical and tabulated comparisons shall be included in the bibliometric analysis.
- 11) The contractor shall run separate analyses on intra vs. extramural publications and show comparison tables that compare the combined program against intramural and extramural publications. The contractor shall compile the extramural citation data into a separate table which summarizes extramural grants program both on a program specific level and on an overall center level.

Task 2: Data Mining Analyses/DDA Reports

Data mining analyses are designed to show what pertinent EPA policy and rulemaking documents cite the Principle Investigator's (PI) publications from the bibliography compiled for each research area. NCER has developed a search tool located at: http://cfepa.saic-solutions.com/citing_ncer/RC_Summary.cfm which operates from the NCER research project database and searches the EPA electronic dockets and the EPA web inventory. Any EPA documents that cite any of the research publications from the bibliography are brought back as "returned hits" identifying (where possible) the EPA office owning the citing document. The contractor shall perform the following tasks as assigned by the EPA WA COR with respect to data mining and compilation of the DDA reports:

- 1) Append/update the database holdings as necessary with updates that may have been included in the NPD research program bibliography; also non-journal publications shall be added to the data mining search from the bibliography. The contractor shall furnish these updates to EPA in the form of a RIS file.
- 2) The EPA WA COR shall provide the data mining "hit list" to the contractor. The contractor shall eliminate any documents that are not policy or rulemaking documents. Also remove any ORD documents that cannot be supported as major rulemaking or policy documents. The contractor shall analyze how the NCER PI publications are being used in the EPA internal documents identified by the data mining tool.
- 3) Data mining results from (2) above shall be tabulated and included in the bibliometric report. Graphical representations shall also be developed to assist in communicating this research impact thru various communication media.

- 4) The contractor shall run "Google Analyses" on subsets of the bibliographies based on a highly cited list and a randomly selected subsample. The contractor shall note any trends in the types of users, or any relationship with how they are being cited/used and by whom.

Task 3: Special add-ons to Bibliometric Reports

The NPDs may request through the NCER WACOR, additional permutations to be run as a part of the bibliometric analysis. The following types of additional reports shall be run if requested by the EPA WA COR:

- 1) Citation Analysis of non-journal publications: The contractor shall run searches using Dialog, ISI, and Google tools to identify citations in scientific journals of EPA reports, book and book chapters, and other non journal publications as requested by the EPA WA COR. These citation analyses shall also be compared to the ISI broad scientific categories.
- 2) Intramural vs. Extramural splits – if requested by the BOSC, a split analysis and comparison of intramural vs. extramural publications shall be run comparing highly cited, high impact factor and high immediacy index rankings.
- 3) Gray literature – a wider Google analysis of EPA white papers may be requested. Analysis of citing web sites and journal and non-journal citing documents shall also be included.
- 4) Collaborative analyses – in some cases an analysis of collaborating or affiliated organizations will be requested. Publications would under this scenario be analyzed for affiliated institutions.
- 6) Other time splits – in some cases analyses by year, 5 year increments or other time duration permutation may be requested.
- 7) Analysis by focus area – in some cases sub-analyses within a research area may be identified by the NPD for separate comparative analyses. In these cases the NPD will provide the appropriate project and publication allocation.

Task 4: Broadcasting the Impact of how cited research is being used

- 1) The contractor shall as requested by the EPA WA COR, perform a manual analysis of the full text of some percentage of highly cited and hot publications to categorize and determine how these publications are being used by other scientists in the field. As a part of this analysis the contractor shall determine whether the research provided special tools or methods, baseline characterization, dose response relationships, etc.
- 2) The contractor shall compile anecdotal examples to convey the extent of research impact. These examples may be worthy of developing multimedia presentations about research impact including videotaped interviews; podcasts (audio and video);
- 3) The contractor shall develop communication plans that engage the public and targeted audiences through PSAs, videos, podcasts, and other multimedia tools.
- 4) The contractor shall determine the impact of these types of communication tools on informing various user groups about Return on Investment of each communication effort.

Schedule of Deliverables

Citation Analyses by RFA Category

Within 4 weeks
from assignment by the EPA WA COR

Impact Analyses

Within 8 weeks from
assignment by the EPA WA COR

Videos and other multimedia:

Within 4 weeks from assignment by the EPA WA COR

A) Staffing

In the work plan, the contractor must identify qualified staff to perform tasks provided in the work assignment. Staff must be qualified to perform citation rate searches on multiple systems. Staff must be qualified to perform bibliometric analyses of citation information and perform comparative analyses with Essential Science Indicators (ESI).

B) Conflict of Interest

The contractor will disclose any conflict of interest regarding this work.

C) Management Controls

Analyses and materials prepared by the contractor will be based on information obtained by the contractor at the direction of the EPA WA COR. Information will be provided to the contractor directly from the principle investigators, the EPA WA COR, or the NPDs.

Deliverables shall be provided to EPA in accepted Agency format and be of high quality. Analysis report deliverables shall be prepared using Excel and Word or appropriate spreadsheet and word processing software. Multimedia deliverables shall be submitted electronically to the EPA WA COR via e-mail as well as via DVDs.

Periodic meetings between the EPA and contractor work assignment managers are encouraged to discuss any questions that may arise during performance or completion of this work assignment. At the EPA WA COR's discretion, these meetings may occur via teleconference or video conferences. The contractor shall document these meetings and submit copies of this correspondence to the EPA WA COR.

The EPA WA COR may identify one or more EPA technical representatives for this work assignment. Interaction between the contractor and any EPA technical representative(s) designated by the EPA WA COR is solely for the purpose of presenting and discussing the information, analyses, results, or presentations related to this work assignment. The interaction will be technical communication vice technical direction. Per the technical direction clause EPAAR 1552.237-71 of the contract, the EPA PO COR and the EPA WA COR or alternate EPA WA COR are the only representatives of the CO authorized to provide technical direction.

Per the technical direction clause, the CO and PO will be provided with copies of all technical direction.

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